MEASURING CHILD HEALTH STATUS USING ALTERNATIVE WEALTH INDICES IN INDIA

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BY

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CERTIFICATE

This is to certify that the project entitled, "Measuring Child Health Status using Alternative Wealth Indices in India" submitted by "Padmaja Bhujabal", bearing Roll Number-413HS1005, in partial fulfillments for the requirements for the award of Masters of Arts in Development Studies at National Institute of Technology, Rourkela (Deemed University) is an authentic work carried out by her under my supervision and guidance.

To the best of my knowledge, the matter embodied in the report has not been submitted to any other University/ Institute for the award of any Degree or Diploma.

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ABSTRACT

Disparities in child health between and within countries have persisted and augmented impressively amid the most recent couple of decades. The reduction of these disparities is a key objective of most developing countries' public health policies, as illustrated in the MDGs 2015. Research on the impacts of socio-economic wellbeing on health is essential for policy makers in developing countries, where limited resources make it critical to utilize existing health care resources to the best preference. The two direct economic measures have been used, namely household income and consumption expenditure. The wealth index is taken as a proxy for consumption expenditure, which tends to have an urban bias. The objective of this paper is to develop and test the need of alternative wealth indices for predicting child health status in India, a developing economy, with assistance of data from Demographic and Health Surveys (DHS) fielded in India. It will underline the importance of going beyond the purely economic view of Socio-Economic Status to cover the multidimensional as well as multilevel concept of economic and social inequality. This study will demonstrate the need for using alternative wealth indices for rural and urban areas. Also, the objective of the paper is to examine whether child health estimates differ with the use of two alternative wealth indices, that is, a single wealth index for the total population at national level and two separate wealth indices for rural and urban areas.

Keywords: Child health, wealth quintile, socioeconomic status

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1. INTRODUCTION

1.1. Measures of Socio-Economic Status

Nancy Krieger has argued that, the people epidemiologists study are simultaneously "social beings and biological organisms" and therefore no epidemiological research should be carried out without considering the role of social factors. It has been recognized for centuries that health is socially patterned. Disadvantaged social groups tend to suffer a disproportionate burden of ill-health, with higher mortality rates and greater incidence, severity and duration of many health problems. The social patterning of health is a consistent finding, with the picture being similar within and across populations, in many settings, across different times, in multiple studies, for varied outcomes, and using multiple measures of social conditions. The broad term Socio-Economic Status (SES) is often used to encapsulate various concepts of social conditions relating to position within a social hierarchy. The reasons for the strong relationship between SES and health are numerous, complex, and intertwined. Position within a social hierarchy is linked to the probability of health-damaging exposures, health damaging or enhancing behaviors, receipt and understanding of health promotion messages, SES and its measurement health-enhancing resources, stress, sense of control, and other material and psychosocial factors that may affect health.

In recent years, the interest of epidemiologists in social determinants of health has intensified and there have been calls for a greater still focus on the social determinants of health in public health research. As Krieger implied, almost all epidemiological studies require a measure of SES. Studies which focus on the social determinants of health, require measures of SES to quantify and understand inequalities in, assess the impacts of policies and interventions on different social groups, and develop and evaluate programs designed to reduce inequalities. Measures of SES are necessary for most observational studies, not just those focusing on social determinants of health. Since SES is a determinant of most health

outcomes and is also related to many of the exposures in epidemiological studies, it is likely to be a confounder of many of the relationships of interest to epidemiologists. There is also growing advocacy for recognition that equity is an essential element to programs and targets such as the Millennium Development Goals, necessitating measures of SES for national and international statistics and monitoring.

Socio-economic status measures a family's or an individual's social and economic position by taking into account their income, education and occupation. It is a strong indicator of health. There are evidences from past researches that show, socioeconomically better off individuals improve on most measures of health status, including mortality, morbidity, malnutrition and health care utilization. This association has been detected between health outcomes including mortality, morbidity, malnutrition and health care utilization. This affiliation has been detected between health outcomes and a matrix of Socio-Economic Status (SES) indicators based on information collected at the individual, household and community levels, including the traditional education, occupation and income measures, information on household possessions and level of community development.

The relation between Socio-Economic Status (SES) and health varies over the ranges of various health conditions and wellbeing, which includes mortality, risk factors and various types of diseases. The health disparities continue lasting in spite of improvements in sanitary facilities, medical care and hygiene. Rather, it is being widened.

In all aspects of epidemiology, measurement matters. Without carefully considered and clearly defined exposure, outcome, and covariate measurement, epidemiological studies are worthless. Socio-economic position should be no exception to this rule. Measures of SES should be selected in a study- and setting-specific way, rather than simply following convention or choosing measures on the basis of convenience. It is not necessarily the case that one SES indicator is universally better than others; different aspects of social and

economic conditions may be more or less important for different diseases, or in different settings. An SES indicator should be an exposure amenable to social policy interventions. This requires a clear understanding of the socio-economic processes being captured by the SES indicator, and knowledge of its causal relationship to health.

Education: Education is considered to measure both resource and prestige aspects of SES. Since education rarely changes after early adulthood, it is often used to reflect early life experiences when looking at inequalities with a life course perspective. It is a very frequently used measure of SES, easy to measure, not generally a sensitive subject to ask questions about, and not subject to large recall bias. Other aspects of SES are related to education; it strongly determines both income and occupation, and is also in itself affected by parental SES. Different groups within a society may get different economic returns for the same level of education - e. g. women and ethnic minorities may benefit less from the same educational level as men and those in majority groups. There are also likely to be cohort effects, since the availability, accessibility, and importance of education will change over time. Education is measured in a variety of ways; most commonly highest grade achieved, number of years completed, or highest qualification. The proposed mechanism linking education to health should guide the choice of measure; is it that every year spent in education leads to an increase in health, or that reaching certain milestones is what matters? This will differ between countries and populations, and will change over time, especially with women and rural populations in low-income settings. Measures of education generally have no indication of the quality of education received. Literacy is sometimes used in preference over education measures because it can be viewed as capturing the skills gained through education that are important for income and occupation potential. Education involves learning facts, concepts, and how to access information. It may, therefore, make individuals more receptive to health messages, more able to access health services, and more likely to invest in behaviors with long-term health benefits. There is also a reciprocal relationship between child health and

educational achievement, since chronic ill-health in childhood may limit educational achievement. Prof. Blane proposes at least five pathways between education and adult health:

1. A child's education is affected by its family's resources, so effects of education on adult health could be reflective of the influence of childhood circumstances

2. Education strongly affects income and occupation in later life

3. Education may affect how receptive an individual is to health messages, both because of ease of understanding these messages and because education may lead to material and cultural resources that facilitate behavior change

4. A background factor may influence both the ability of an individual to successfully complete education and their ability to maintain health

5. Health in childhood can affect educational achievement and is also strongly predictive of adult health

Occupation: Many occupations have direct effects on health, for instance job involving hazardous substances or hard labour. More generally, occupation is believed to affect health both through income (and hence access to material resources) and through psychosocial pathways operating through occupational prestige, sense of control, stress, and social networks. Occupational prestige can be viewed as having elements of Marxian, Weberian, and Functionalist theory. In Weberian terms, occupation straddles Weber's class and status domains, in Marxian terms occupation would be divided on the basis of being exploited or an exploiter. Occupation is strongly related to both education as well as income. Occupational prestige measures have been extremely popular in high-income countries, especially in the United Kingdom, where occupation is recorded on death certificates. It has been far less widely used in low-income settings. Various schemes exist for classifying occupations in Britain and other industrialized settings. These classification schemes may incorporate

concepts of autonomy and job control, promotion prospects, job stability, ability to hire others, educational requirements of the job, and so on. Such classification schemes and measurement scales are not readily transferable to low-income settings. One limitation to occupational measures is that unemployed people are often missed out, as are retired people, people whose work is mainly in the home (primarily affecting women), students, and those working in unpaid/illegal/informal jobs. For women, husband's occupation is often used, but this requires a set of assumptions about the status of women, the roles of husbands and wives, and the mechanisms linking occupation to health. Similarly, the occupation of the head of the household is often used to categorize the rest of the household, also necessitating assumptions about the pathways between occupation and health. In low- and middle-income countries, categorization of occupations is more complex than in more industrialized settings. People may be employed casually, seasonally or temporarily, or maybe having multiple jobs.

Income: Income is an attempt to measure material living standards, and is therefore primarily used in epidemiology when a material explanation for health inequalities is hypothesized. Income is also tied in with concepts of prestige, although its primary mode of action is believed to be through command over material resources. Income is generally hypothesized to affect health through the increased consumption of health enhancing commodities, such as food, shelter, and access to health services. There is also likely to be a bi-directional relationship between income and health, whereby ill-health leads to a reduction in income. Income may fluctuate over time more than most other SES indicators, although this is largely ignored in epidemiological studies. Income is collected at the household level.. Multiple sources of income should be included when collecting income data, e. g. formal employment, informal employment, remittances, benefits, income from rental properties, etc. Since income is a particularly sensitive topic and interviewees may be reluctant to divulge the information, proxies for income are often used. Alternatively, questionnaires may include

predefined income categories, which may be a less sensitive way of asking about income and hence yield a better response rate.

Consumption expenditure: The Permanent Income Hypothesis given by Milton Friedman Categorizes income into two dimensions, such as current income; and planned and anticipated income, which is known as permanent income. According to him the consumption decisions taken by households and individuals depends primarily on their permanent income. Current income is hypothesized to affect health primarily through its effect on consumption. Since consumption may be a more accurate representation of long term economic position, it could be argued that it is a more useful SES indicator than income. This is particularly true in health research, where it is long-term SES rather than recent conditions that is more likely to affect many health outcomes.

Consumption expenditure, where expenditure on a variety of items is summed to get an approximate aggregate of total expenditure, is an attempt to measure actual consumption. Consumption expenditure varies considerably over time. Consumption expenditure data are usually difficult as well as costly to collect. In a few circumstances, expenditure journals can be utilized to gather consumption expenditure information tentatively, where every individual from a household may be solicited to finish a journal from the total expenditures every day for a specified time. This method of data collection, however, is expensive, complex, and time-consuming. It requires repeated visits to households to guarantee that they are finishing the journals effectively. It additionally requires the respondents to be literate. Hence, the journal method is considered tedious and not feasible for carrying research in low-income settings. The data collection methods of consumption expenditure for large households have been created in this manner in low- and middle income settings. In such circumstances, potential expenditure items are listed and included in the questionnaire and the respondents are asked to marks their consumption patterns depending on purchases and expenditure.

Goods received in kind and home produced goods are also included. The choice of equivalence scale used to adjust the aggregate expenditure tends to have a significant effect on the final measure. There are questions over the reliability of consumption expenditure measures generated through survey methods, since review of expenditures may be problematic, and various noteworthy assumptions are obliged to ascertain the aggregate measures.

In order to form appropriately the arrangements and projects of any nation, it is inevitable to take into consideration the disparities in health status of the major population of the country. The consumption expenditure and household income are not included in numerous population based health surveys, such as Demographic and Health Surveys (DHS) due to the following reasons:

Firstly, there is a limitation of under-reporting of income and consumption expenditure and these measures are also sensitive to consumption and size of the household.

Secondly, as far as the consumption expenditure and income of the household are concerned, they do not meet different dimensions of well being.

Third, the process of assimilation of consumption expenditure and household income encompass additional time and higher expenses.

1.2 Wealth Index as a measure of Socio-Economic Status:

A wealth index is a composite measure of markers of ownership of consumer durables, housing characteristics, and access to public services. It is utilized as a measure of SES in low and middle-income countries. A wealth index is referred to variously as an asset index, a living-standards index, or simply referred to as a socio economic index.

The wealth index approach has emerged from demographic studies such as the Demographic and Health Surveys (DHS). There was growing enthusiasm in using the high quality, broadly illustrative, nationally-representative, and internationally comparable health data in the DHS to measure and analyze socio-economic inequalities, but the DHS does not contain any data on economic indicators such as consumption expenditure or income. The DHS however, collects data on ownership of a range of durable assets (e. g. car, refrigerator, television), housing characteristics (e. g. material of dwelling floor and roof, main cooking fuel), and access to basic services (e. g. electricity supply, source of drinking water, sanitation facilities). These items were all initially included in the surveys for their direct influences on health, for instance television and radio ownership was of interest to identify the households receiving public health messages. Researchers started to see that these assets could be utilized as indicators of living standards and began constructing wealth indices for that purpose.

According to researchers, wealth index is a reliable alternative to consumption expenditure as it provides reliable, basic and rational information. This is alluring to researchers wishing to utilize the wealth index for primary data collection, as the collection of consumption expenditure data is generally considered unfeasible for most epidemiological studies due to the length of time required to complete a consumption expenditure questionnaire module. This is also appealing to those concerned about the authenticity of consumption data, since the wealth index approach depends on simple and straight forward questions which are less likely to suffer from recall bias than expenditure questions.

Wealth indices measure SES at the household level. Using a household-level SES measure has its own limitations, since individual-level SES indicators apparently are more amenable to effective policy interventions and also household and individual SES may affect health through distinctive pathways. This limitation is not, however, constrained to the wealth index; income and expenditure are also often used as household-level indicators.

1.3 Need for the Study:

Children's health determination has as of late turned into the center of a small, but expanding measure of economic writing. Beside the impulse given by any immediate enhancements in children's health that may be encouraged, the enthusiasm for this subject stems from two overwhelming sources.

To experts concerned with the procurement of health services, child health status is of prompt and massive interest. Child health is an essential determinant of the interest for health services.

Child health status is likewise of significance to economists mulling over human capital issues. Of course, poor health status amid childhood has a long has a long-term impact by means of its negative impacts on human capital investment amid that period. Research has exhibited that childhood health status is significantly connected with psychological improvement, schooling, adult health status and adult earnings.

Child health is a part of the Millennium Development Goals (MDG); the world's time bound and quantified targets for addressing extreme poverty in its many dimensions and basic human rights-health, education, shelter and security. The MDGs are eight worldwide improvement goals that were secured after the Millennium Summit of the United Nations in 2000, after the appropriation of the United Nations Millennium Declaration. Every one of the

193 United Nations part states and 23 universal associations swore to help in accomplishing the MDGs by 2015.

The eight MDGs are as follows:

I. Eradicate extreme poverty and hunger
II. Achieve universal primary education
III. To promote gender equality and empower women
IV. To reduce child mortality
V. To improve maternal health
VI. To combat HIV/AIDS, malaria and other diseases
VII. To ensure environmental sustainability
VIII. To develop a global partnership for development

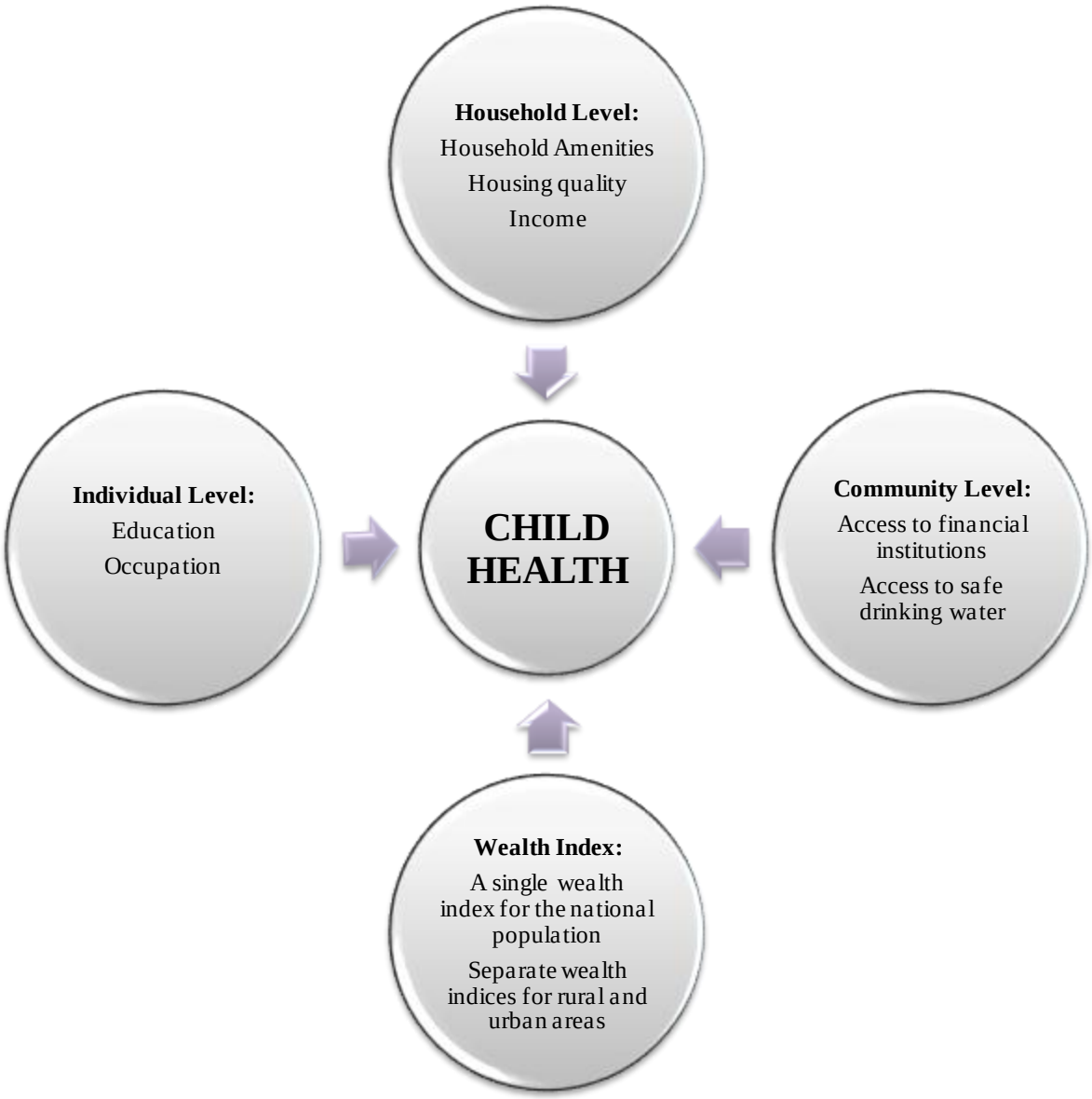
The MDG IV focuses to reduce child mortality.

Additionally, research on the impacts of socio economic well being on health is critical for policy makers in developing countries, where limited resources make it significant to utilize existing health care resources to the best advantage.

1.4 Objectives of the Study:

- To examine the effectiveness of using separate wealth indices each for rural and urban areas.
- To access whether the estimates of child health differ when two alternative wealth indices are used

1.5 Conceptual Framework



2. LITERATURE REVIEW:

Everson et al. (2002) inferred that many international literature which studies epidemiology and socio economic status of individuals, have recognized the close link between the same and their health status. These studies have incorporated many varied perspectives related to health status and socio-economic status of individuals.

Hanson & Chen (2007) found that earlier studies have time and again recognized the social class gradients of health among adults and children. When the socio economic status of a child is low, a close link is found which results in negative effects of health status like acute illness, vision impairments and auditory predicaments and amplified levels of chronic illness.

Adler et al. (1994) studied that, low socioeconomic status is linked with higher propensities of mortality and morbidity scales which comprises of cancer, asthma, cardiovascular diseases and hypertension among adults.

Wardle & Steptoe (2003) concluded that adults with low socio-economic status are more prone to bad and frail health condition and likely their health behaviors are precarious. Hence, this increases their vulnerability to bad health conditions.

Chen (2004) examined the causes of linkage between lower socioeconomic status and poor health status of individuals. He concluded that low socioeconomic status leads to poor standard of living, minimum access to health care services and limited information about behaviors compromising health and more stress, which affects the health status of individuals.

Currie et al. (1997) opined that, the connection between socio-economic status and health status may not necessarily be the same throughout the life cycle of an individual.

Filmer and Pritchett (2001) studied that wealth index acts as an alternative to represent economic status of a nation or household or an individual.

Howe et al. (2008) illustrated that wealth index can also be a frail or insufficient indicator towards measuring inequality and consumption expenditure.

“The Spearman’s rank correlation of wealth index and consumption expenditure varies largely across countries; from 0.37 in Mozambique (Sahn & Stifel, 2003) to 0.56 in Indonesia and 0.64 in Nepal” (Filmer & Pritchett, 2001).

Bollen et al. (2002) differentiated the choice of alternatives which are used to mark the disparity in the economic ranking of the household.

Epstein and his colleagues (1988, 1990) found in two studies that patients of lower SES usually tended to require longer lengths of stay and utilized more health resources. Similarly, other researchers have found that, “the lack of insurance coverage is associated with lower health status and that low socioeconomic status often results in increased hospital utilization.” (Tedeschi, Wolfe, and Griffith, 1990; Lurie et al., 1984; Ayanian et al., 1993).

Grossman (2000) analyzed the importance of "health capital" which is required for earrings of an individual and household and same for education.

Smith (1999) discussed about the possibilities where there can be inter generational diffusion of economic status and knowledge in terms of education if poor health persists in childhood.

Vyas and Kumaranayake (2006) discussed how the distributions of wealth indices tend to differ across countries and regions across a country; there is frequently either clumping, that is, where a large proportion of households have the same wealth index score, typically a low score in poor rural areas, or truncation that is, where the tail of the distribution is cut short.

3. DATA SOURCES AND METHODOLOGY:

3.1. Data Sources and Methods:

Data from the Demographic and Health Survey (DHS) in India has been utilized in the analysis.

The DHS Program is in charge for collecting and disseminating accurate, nationally representative information on health and population in developing and under developed countries. The project is implemented by ICF International and is supported by the United States Agency for International Development (USAID) with donations from other donors such as UNICEF, UNFPA, WHO and UNAIDS. It provides information for an extensive variety of monitoring and impact evaluation indicators in the zones of population, health and nutrition.

The DHS covers a nationally representative sample, which includes 51555 households in the country. The survey covers distinctive schedules for the independent data collection on individuals, such as kids, men and women and household. The women schedule contains data on health, nutrition and data on mothers and children. The household schedule gives data on the quality of housing, household durables and amenities.

3.2. Independent Variable:

Wealth Index:

A wealth index is a composite measure of, typically, indicators of ownership of consumer durables, housing characteristics, and access to public services. It is used as a measure of SES in low- and middle-income countries.

Two alternative wealth indices were used:

i) Index I: a single wealth index for the national population

ii) Index II: a wealth index derived from rural and urban wealth indices (separate wealth indices are constructed for rural and urban areas)

3.3. Dependent Variables:

1. Mortality: Mortality is defined as the number of the deaths that occur in a particular time or place. Mortality has been classified into three categories:

i) Neo-natal Mortality: It is the number of deaths in the first 28 days (0 months) of life.

ii) Infant Mortality: It is the number of deaths of infants under 1 year old. (1-11 months).

iii) Child Mortality: It is the number of deaths of children who die by the age of 5, but the analysis done here is based on the number of deaths of children who die by the age of 2.

The variables are dichotomous and categorized as dead=1, alive=0.

2. Immunization: Immunization is the process by which an individual's immune system becomes fortified against an agent. Here, in this analysis the full immunization includes BCG and three doses each of DPT and polio vaccine for children aged 12-23 months. The variable is dichotomous and categorized as fully immunized=1, otherwise=0.

3. Stunting: Stunting refers to the height-for-age of the child. The variable is dichotomous and categorized as stunted=1, otherwise=0.

3.4. Methodology:

The most important task while constructing a wealth index is to decide the assignment of weights to each indicator. The simplest method is to add the number of indicators of all the households. But the limitation to this method is that it can be arbitrary and each indicator will be assigned equal weight of one, so there will be no difference in value in terms of SES. The other methods include using price information for valuation of items or giving higher weights to rare items. Another method is to use statistical procedure.

Filmer and Pritchett recommended the use of Principal Components Analysis (PCA) for assigning weights for the components of wealth index and the instruction guidelines for using PCA was given by Vyas and Kumaranayake.

Various concerns about the use of PCA to construct wealth indices have been expressed. These include:

i) The system is complex and can be accused for clouding the process of the construction of index

ii) PCA is proposed for continuous variables, but is very often applied to binary and categorical indicators for wealth index construction.

A further concern about the construction of wealth indices is the choice of indicators used. Those used in the DHS have been selected because of availability, rather than based on any theoretically-based hypothesis. The extent to which these indicators have been adopted by those using the wealth index approach in primary data collection, and the approaches used to select indicators for wealth indices are still unknown.

PCA is a data reduction procedure that was developed by Karl Pearson. It is widely used in psychometrics. It involves replacing a set of correlated variables with a set of uncorrelated principal components which represent unobserved characteristics of the population. The weights are derived from the correlation matrix of the data.

Finally, the DHS tend to generate one wealth index for a whole country, such that PCA is performed for urban and rural areas combined. It is not known whether this is the most appropriate way of constructing a wealth index, or whether this is how those using the wealth index in primary data collection also tend to create the wealth index. One potential problem with creating a single index for urban and rural areas is that many of the indicators in the DHS wealth index could be described as having an `urban bias'; i. e. urban households are far more likely to have access to improved water and sanitation, have an electricity supply, and

live in a dwelling constructed from modern rather than traditional materials compared with rural households. Vyas & Kumaranayake discuss "how the distributions of wealth indices tend to differ across countries and areas within a country; there is frequently either clumping (where a large percentage of households have equal wealth index score, typically a low score for poor rural areas), or truncation (where the tail of the distribution is cut short)."

For constructing a wealth index, the first principal component is taken to represent the household's socioeconomic status. Assets that are more unequally distributed across the sample will have a higher weight in the principal component. The weights for each indicator from this first principal component are used to generate a household score, with higher weights indicating higher socioeconomic status and vice versa. The relative rank of households using the score is then used for the construction of wealth index by dividing the population into quintiles.

PCA was used in the construction of the wealth indices:

i) Index 1: a single wealth index for the total national population

ii) Index 2: a wealth index derived from rural and urban wealth indices (Separate wealth indices are constructed for urban and rural areas).

The use of alternate wealth indices addressed two important issues, such as the choosing of indicators and the correlation of the variables used. At first, a set of wealth indices were explored by the exclusion and inclusion of indicators based on theory. The wealth index with limited indicators was hardly different from another wealth index with more variables. Hence it encouraged to use numerous variables possible for the determination of wealth indices.

The household schedule asked about certain aspects of household ownership to determine wealth/asset quintile. Based on the methodology used in DHS such as assets, amenities, facilities and consumer durable items (such as fan, television, telephone, car etc.) type of house, type of drinking water source, source of light, cooking fuel used, toilet-facilities were

included. Possession of each item was converted in to a dichotomous variable. For example, if a household had TV it was given a score '1' and the household which did not have TV was given a score of 0. In case a variable has more than two values/code categories, then one of them is given value '1' and the rest values were equated to '0'. Considering all these dichotomous variables, principal component analysis was applied and each of the above household assets was assigned a weight or a factor score derived through the principal component analysis. The Asset score was determined using the following formula:

$$Asset\ Score\ (AS) = \frac{Value\ of\ \ Asset\ Variable - Mean\ of\ \ Asset\ Variable}{SD\ of\ \ Asset\ Variable} \times Asset\ Factor\ Score$$

Then all the asset scores were added to get a total asset score for each household. Then the households were ranked according to their individual household asset score and then divided into five quintiles, Poorest (Q1), Poorer (Q2), Middle (Q3), Richer (Q4) and Richest (Q5). This provided us the cut-off points or the ranges for each quintile.

The analysis of the study is specific to India. No other sub level analyses were performed. The kid's file and the household file were used for the analyses. The derivation of the wealth indices were done using the household file and the health estimate differentials were analysed by the use of the kid's file. The analyses were derived by the software, IBM SPSS 20.

4. RESULTS AND DISCUSSION:

Table 1: Mean standard deviation & component matrix of asset variables used in wealth index (Total)

Variable Name	Mean	Standard Deviation	Factor Score
Household having access to electricity	0.67	0.471	0.682
Household having radio	0.3	0.458	0.368
Household having refrigerator	0.16	0.369	0.642
Household having TV	0.45	0.497	0.761
Household having bicycle	0.43	0.495	0.151
Household having bike or scooter	0.18	0.383	0.592
Household having car	0.04	0.184	0.347
Educational level of individual	0.59	0.492	0.499
Household having telephone	0.13	0.333	0.571
Household having mattress	0.6	0.491	0.606
Household having pressure cooker	0.43	0.496	0.755
Household having chair	0.54	0.498	0.701
Household having cot/bed	0.8	0.402	0.426
Household having table	0.47	0.499	0.695
Household having electric fan	0.49	0.5	0.715
Household having black & white TV	0.2	0.402	0.234
Household having color TV	0.27	0.443	0.724
Household having sewing machine	0.21	0.41	0.546
Household having computer	0.02	0.155	0.3
Household having water pump	0.09	0.284	0.286
Household having thresher	0.01	0.117	0.071
Household having tractor	0.02	0.128	0.123
Household having cows/bulls/buffalo	0.33	0.471	-0.143
Household having camels	0.01	0.076	-0.023
Household having horses/donkeys/mules	0.01	0.081	-0.023
Household having goats	0.14	0.347	-0.213
Household having sheep	0.01	0.12	-0.056
Household having chickens	0.2	0.398	-0.119
Source of drinking water	0.05	0.227	0.097
Type of floor material	0.42	0.494	0.697
Type of wall	0.55	0.497	0.61
Type of roof	0.74	0.439	0.535
Household having own house	0.79	0.406	0.145
Household having bank or savings account	0.12	0.329	0.296
Household having flush toilet	0.4	0.49	0.725
Household having pit toilet	0.09	0.286	-0.044
Household having no toilet	0.51	0.5	-0.686
Household having no window	0.631	0.631	0.631

Table 2: Wealth Index: Total

Wealth Quintiles	Frequency	Percent
Poorest	10298	20
Poorer	10325	20
Middle	10311	20
Richer	10311	20
Richest	10310	20
Total	51555	100

The Table 1 above shows the mean, standard deviation and factor score of the asset variables in wealth index while calculating the total number of households in the country.

The Table 2 shows the classification of the total number of households according to the wealth quintiles, they are categorized as poorest (Q1), poorer (Q2), middle (Q3), richer (Q4) and richest (Q5).

The total number of households is 51555.

Table 3: Mean standard deviation & component matrix of asset variables used in wealth index (Urban)

Variable Name	Mean	Standard Deviation	Factor Score
Household having access to electricity	0.87	0.338	0.679
Household having radio	0.34	0.473	0.37
Household having refrigerator	0.3	0.458	0.63
Household having TV	0.68	0.467	0.696
Household having bicycle	0.42	0.493	0.244
Household having bike or scooter	0.29	0.453	0.575
Household having car	0.07	0.249	0.339
Educational level of individual	0.74	0.436	0.385
Household having telephone	0.21	0.409	0.542
Household having mattress	0.74	0.44	0.641
Household having pressure cooker	0.7	0.46	0.718
Household having chair	0.7	0.459	0.686
Household having cot/bed	0.83	0.378	0.582
Household having table	0.62	0.486	0.674
Household having electric fan	0.74	0.438	0.629
Household having black & white TV	0.24	0.426	0.037
Household having color TV	0.48	0.5	0.692
Household having sewing machine	0.31	0.463	0.5
Household having computer	0.06	0.229	0.31
Household having water pump	0.1	0.295	0.324
Household having thresher	0	0.053	0.045
Household having tractor	0	0.064	0.054
Household having cows/bulls/buffalo	0.1	0.296	-0.005
Household having camels	0	0.053	0.026
Household having horses/donkeys/mules	0	0.053	-0.016
Household having goats	0.04	0.204	-0.089
Household having sheep	0	0.054	-0.017
Household having chickens	0.09	0.286	-0.041
Source of drinking water	0.05	0.213	0.054
Type of floor material	0.69	0.462	0.624
Type of wall	0.76	0.427	0.599
Type of roof	0.86	0.348	0.626
Household having own house	0.71	0.452	0.35
Household having bank or savings account	0.19	0.388	0.269
Household having flush toilet	0.73	0.445	0.681
Household having pit toilet	0.06	0.241	-0.122
Household having no toilet	0.21	0.406	-0.673
Household having no window	0.76	0.427	0.666

Table 4: Wealth Index: Urban

Wealth Quintiles	Frequency	Percent
Poorest	3896	20
Poorer	3897	20
Middle	3906	20
Richer	3887	20
Richest	3897	20
Total	19483	100

The Table 3 above shows the mean, standard deviation and factor score of the asset variables in wealth index while calculating the urban number of households in the country.

The Table 4 shows the classification of the urban households according to the wealth quintiles, they are categorized as poorest (Q1), poorer (Q2), middle (Q3), richer (Q4) and richest (Q5).

The total number of urban households is 19483.

Table 5: Mean standard deviation & component matrix of asset variables used in wealth index (Rural)

Variable Name	Mean	Standard Deviation	Factor Score
Household having access to electricity	0.55	0.498	0.636
Household having radio	0.28	0.447	0.396
Household having refrigerator	0.08	0.27	0.563
Household having TV	0.3	0.459	0.738
Household having bicycle	0.44	0.496	0.167
Household having bike or scooter	0.11	0.315	0.552
Household having car	0.02	0.127	0.305
Educational level of individual	0.5	0.5	0.469
Household having telephone	0.08	0.264	0.554
Household having mattress	0.51	0.5	0.557
Household having pressure cooker	0.28	0.447	0.688
Household having chair	0.44	0.497	0.686
Household having cot/bed	0.78	0.415	0.398
Household having table	0.38	0.485	0.688
Household having electric fan	0.34	0.474	0.679
Household having black & white TV	0.18	0.384	0.385
Household having color TV	0.14	0.347	0.651
Household having sewing machine	0.15	0.36	0.55
Household having computer	0.01	0.077	0.185
Household having water pump	0.08	0.278	0.313
Household having thresher	0.02	0.142	0.176
Household having tractor	0.02	0.154	0.261
Household having cows/bulls/buffalo	0.48	0.499	0.124
Household having camels	0.01	0.087	-0.017
Household having horses/donkeys/mules	0.01	0.094	0.007
Household having goats	0.2	0.398	-0.121
Household having sheep	0.02	0.145	-0.013
Household having chickens	0.26	0.44	0.008
Source of drinking water	0.06	0.235	0.166
Type of floor material	0.25	0.435	0.614
Type of wall	0.43	0.495	0.524
Type of roof	0.67	0.471	0.465
Household having own house	0.84	0.366	0.202
Household having bank or savings account	0.09	0.281	0.223
Household having flush toilet	0.2	0.401	0.608
Household having pit toilet	0.11	0.308	0.057
Household having no toilet	0.69	0.462	-0.565
Household having no window	0.55	0.497	0.597

Table 6: Wealth Index: Rural

Wealth Quintiles	Frequency	Percent
Poorest	6404	20
Poorer	6425	20
Middle	6414	20
Richer	6415	20
Richest	6414	20
Total	32072	100

The Table 5 above shows the mean, standard deviation and factor score of the asset variables in wealth index while calculating the rural number of households in the country.

The Table 6 shows the classification of the total number of rural households according to the wealth quintiles, they are categorized as poorest (Q1), poorer (Q2), middle (Q3), richer (Q4) and richest (Q5).

The total number of rural households is 32072.

Child health estimates by wealth groups of Index 1 and Index 2:

This section compares the estimates of child health status, namely mortality (which is categorized into neonatal mortality, infant mortality and child mortality), children fully immunized and stunting by wealth groups using the two alternate indices.

Mortality:

Table 7: Neonatal Mortality:

Wealth Quintile	Index 1 (A single wealth index for the national population)	Index 2 (Separate wealth index for rural and urban areas)	Difference (Index 1 – Index 2)
Poorest (Q1)	46	44	2
Poorer (Q2)	41	39	2
Middle (Q3)	32	35	-3
Richer (Q4)	27	29	-2
Richest (Q5)	21	21	0
Total	33	33	0

Table 8: Infant mortality:

Wealth Quintile	Index 1	Index 2	Difference
Poorest (Q1)	19	19	0
Poorer (Q2)	22	20	2
Middle (Q3)	16	19	-3
Richer (Q4)	11	12	-1
Richest (Q5)	7	6	1
Total	15	15	0

Table 9: Child Mortality:

Wealth Quintile	Index 1	Index 2	Difference
Poorest (Q1)	13	11	2
Poorer (Q2)	11	11	0
Middle (Q3)	7	8	-1
Richer (Q4)	3	4	-1
Richest (Q5)	2	2	0
Total	7	7	0

Tables 7, 8 and 9 show the neonatal mortality, infant mortality and child mortality estimates respectively by using alternate wealth indices. The tables show the differences that occur when we use two different wealth indices.

In table 7, there are differences in Q1, Q2, Q3 and Q4 quintiles.

In table 8, there are differences in Q2, Q3, Q4 and Q5 quintiles.

In table 9, there are differences in Q1, Q3 and Q4 quintiles.

Table 10: Children fully immunized:

Wealth Quintile	Index 1	Index 2	Difference
Poorest (Q1)	27.4	29.6	-2.2
Poorer (Q2)	32.1	32.2	-0.1
Middle (Q3)	48.1	43.7	4.4
Richer (Q4)	57.9	54.5	3.4
Richest (Q5)	70.6	66.9	3.7
Total	43.5	43.5	0

Table 10 shows the immunization status of children aged between 12-23 months by using alternate wealth indices. The table shows significant differences between Index 1 and Index 2, ranging from -2.2 to 4.4. There are differences in all the five quintiles.

Table 11: Stunting:

Wealth Quintile	Index 1	Index 2	Difference
Poorest (Q1)	52.1	50.8	1.3
Poorer (Q2)	53.4	53.8	-0.4
Middle (Q3)	47.6	48.4	-0.8
Richer (Q4)	39.9	42.5	-2.6
Richest (Q5)	26.3	29.7	-3.4
Total	46.1	46.1	0

Table 11 shows the stunting, that is the height-for-age of children aged by using alternate wealth indices. The table shows significant differences between Index 1 and Index 2, ranging from -3.4 to 1.3. There are differences in all the five quintiles.

As it can be seen from the above results, the agreement between the two wealth indices was weak. The statistical and theoretical significance of a national wealth index is critical and should be an important topic of discussion. A typical practice of inferring a single PCA-based wealth index for the total population, as opposed to partitioned lists for rural and urban regions is practised. The practice of a single wealth index would lead to overestimation of wealth groups in rural areas and underestimation in urban areas. Separate wealth indices will be useful in providing cut off details of the poor and non poor in specific areas which would lead to derivation of specific health estimates. It would very much helpful for the planners and the policy makers of the country.

5. CONCLUSION:

Demographic and Health Surveys (DHS) information are generally utilized as a part of scholastics, research and in addition by organizers and policy makers. These overviews don't gather information on income or household expenditure. Rather, they utilize a composite file in view of economic intermediaries, for example, customer durables, quality of housing, sanitary facilities and size of area possessions that mirror the long haul economic status of households. A wealth index is progressively utilized to clarify the economic differentiation in health care use and utilization in numerous nations, including India. Utilizing the India DHS information, the aim was to inspect if the health appraises by wealth quintiles were sensitive to rural and urban details of the wealth index. In the first situation (Index 1), the variables taken were utilized to determine the total wealth index for. In the second situation (Index 2), alternative wealth indices were registered for urban and rural zones. The tests were based on differentials by five wealth quintiles: the poorest, the poorer, the middle, the richer and the richest. The health assessments taken are a set of child health measures, to be specific, neonatal mortality, infant mortality, child mortality, immunization and stunting.

For little and extensive scale overviews which need income or expenditure information, wealth index ought to be utilized and the consideration of variables which are sensitive to urban and rural areas ought to be talked about. Additionally, there should be an analysis of the factual, statistical and theoretical significance. The findings of the study propose the development of a different wealth index for urban and rural areas. Despite of the fact that the estimation of consumer durables shifts impressively crosswise over nations, it is helpful to attempt and determine data about the amount and market prices of consumer durables in developing a more specific, particular and robust wealth index. Ultimately, giving additional wealth variables to the poor and non-poor, according to official estimates of poverty, is firmly prescribed for.

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